

What is claimed is:

1. An air bag device, comprising:  
an inflatable cushion being configured for deployment from said  
5 air bag device;  
an inflator for inflating said inflatable cushion, said inflator being  
in fluid communication with said inflatable cushion, said inflator comprising a  
first initiator for initiating a first stage of inflation and a second initiator for use  
with said first initiator for initiating a second stage of inflation, said first stage  
10 of inflation providing a first inflation output to said inflatable cushion; and  
a deployable member disposed within said inflatable cushion,  
said deployable member being in fluid communication with said inflator,  
wherein said first stage of inflation causes said deployable member to deploy in  
a first direction;  
15 wherein unobstructed deployment of said deployable member in  
said first direction will cause an activation signal to be sent to said second  
initiator to initiate said second stage of inflation.
2. The air bag device as in claim 1, further comprising a sensing  
20 device operably coupled to said deployable member, said sensing device further  
comprising a sensing element that provides a signal to a sensing and diagnostic  
module wherein said sensing and diagnostic module provides said activation  
signal to said second initiator when said deployable member deploys in an  
unobstructed manner.
- 25 3. The air bag device as in claim 2, wherein deployment of said  
deployable member in said first direction causes a leading edge of said  
inflatable cushion to reach a distance from the air bag device prior to said  
second stage of inflation, said distance being defined by the configuration of  
30 said deployable member.

4. The air bag device as in claim 3, wherein said maximum distance of said leading edge is reached faster than said inflatable cushion being inflated without said deployable member disposed therein.

5 5. The air bag device as in claim 2, wherein said sensing device further comprises a tether that is secured to a forward end of said deployable member at one end and said sensing element at the other wherein the distance between said forward end and said sensing element during unobstructed deployment of said deployable member is longer than said tether and said tether  
10 provides a force to said sensing element causing said activation signal to be sent to said second initiator.

6. The air bag device as in claim 5, wherein deployment of said deployable member in said first direction causes a leading edge of said  
15 inflatable cushion to reach a maximum distance from the air bag device prior to said second stage of inflation, said maximum distance of said leading edge being defined by the configuration of said deployable member.

7. The air bag device as in claim 6, wherein said maximum distance  
20 of said leading edge is reached faster than said inflatable cushion being inflated without said deployable member disposed therein.

8. The air bag device as in claim 1, further comprising a sensing device operably coupled to said deployable member, said sensing device further  
25 comprising an upper tether, a lower tether and a central tether, said central tether being secured to a forward end of said deployable member at one end and said sensing element at the other and said lower tether and said upper tether are each secured to forward portions of said deployable member at one end and a portion of the air bag device at the other, wherein the distance between said  
30 forward end and said sensing element during unobstructed deployment of said deployable member is longer than said central tether and during unobstructed

deployment of said deployable member said central tether provides a force to said sensing element causing said activation signal to be sent to said second initiator, and said upper tether and said lower tether are each longer than said central tether, wherein either said upper or said lower tether will prevent said  
5 central tether from providing a force to said sensing element when said deployable member fully deploys in a direction other than said first direction.

9. The air bag device as in claim 1, wherein deployment of said deployable member in said first direction causes a leading edge of said  
10 inflatable cushion to reach a distance from the air bag device prior to said second stage of inflation, said distance being defined by said deployable member.

10. The air bag device as in claim 9, wherein said distance of said  
15 leading edge is reached faster than said inflatable cushion being inflated without said deployable member disposed therein.

11. The air bag device as in claim 1, further comprising a diffusing member disposed about said inflator, said diffusing member providing an  
20 extension at either end of said inflator, said extensions causing a portion of said deployable member to be positioned away from said inflator.

12. The air bag device as in claim 11, wherein said diffusing member  
25 secures a rearward portion of said deployable member behind said inflator such that said inflator is disposed within said deployable member.

13. The air bag device as in claim 12, wherein said deployable member is a tubular member having a first end portion and a second end portion, said first end portion being secured to one end of said inflator and said  
30 second end portion is secured to the other end of said inflator, wherein a portion

of said tubular member disposed between said first end and said second end deploys in said first direction.

14. An air bag module, comprising:
- 5 a housing;
- an inflatable cushion being configured for deployment from said housing;
- an inflator for inflating said inflatable cushion, said inflator being in fluid communication with said inflatable cushion, said inflator comprising a
- 10 first initiator for initiating a first stage of inflation and a second initiator for use with said first initiator for initiating a second stage of inflation, said first stage of inflation providing a first inflation output to said inflatable cushion;
- a deployable member disposed within said inflatable cushion, said deployable member being in fluid communication with said inflator,
- 15 wherein said first stage of inflation causes said deployable member to deploy in a first direction; and
- a securement member disposed about said inflator, said securement member securing said deployable member to said housing;
- wherein unobstructed deployment of said deployable member in
- 20 said first direction will cause an activation signal to be sent to said second initiator to initiate said second stage of inflation.

15. The airbag module as in claim 14, wherein said deployable member is a tubular member having a first end portion and a second end
- 25 portion, said first end portion being secured to one end of said inflator and said second end portion is secured to the other end of said inflator, wherein a portion of said tubular member disposed between said first end and said second end deploys in said first direction, wherein said inflator provides an inflation output to said first end portion and said second end portion and said securement
- 30 member positions said first end portion and said second end portion away from said inflator.

16. The airbag module as in claim 14, further comprising a sensing device operably coupled to said deployable member, said sensing device further comprising an upper tether, a lower tether and a central tether, said central  
5 tether being secured to a forward end of said deployable member at one end and said sensing element at the other and said lower tether and said upper tether are each secured to forward portions of said deployable member at one end and a portion of the airbag module at the other, wherein the distance between said  
10 forward end and said sensing element during unobstructed deployment of said deployable member is longer than said central tether and during unobstructed deployment of said deployable member said central tether provides a force to said sensing element, said sensing element generating said activation signal, wherein said activation signal is directly sent to said second initiator, and said upper tether and said lower tether are each longer than said central tether,  
15 wherein either said upper or said lower tether will prevent said central tether from providing a force to said sensing element when said deployable member fully deploys in a direction other than said first direction.

17. The airbag module as in claim 14, further comprising a sensing  
20 device operably coupled to said deployable member, said sensing device further comprising an upper tether, a lower tether and a central tether, said central tether being secured to a forward end of said deployable member at one end and said sensing element at the other and said lower tether and said upper tether are each secured to forward portions of said deployable member at one end and a  
25 portion of the airbag module at the other, wherein the distance between said forward end and said sensing element during unobstructed deployment of said deployable member is longer than said central tether and during unobstructed deployment of said deployable member said central tether provides a force to said sensing element causing a signal to be sent to a sensing and diagnostic  
30 module wherein said sensing and diagnostic module provides said activation signal to said second initiator in response to said signal, and said upper tether

and said lower tether are each longer than said central tether, wherein either said upper or said lower tether will prevent said central tether from providing a force to said sensing element when said deployable member fully deploys in a direction other than said first direction.

5

18. A proximity detection device disposed within an inflatable cushion of an air bag module, the proximity detection device comprising:  
an inflatable member; and

a sensing device operably coupled to said inflatable member,  
10 said sensing device comprising a tether that is secured to a forward end of said inflatable member at one end and a sensing element at the other wherein the distance between said forward end and said sensing element during unobstructed deployment of said deployable member in a first direction is longer than said tether and said tether provides a force to said sensing element  
15 causing a signal to be generated when said inflatable member deploys in an unobstructed manner in said first direction.

19. The proximity detection device as in claim 18, wherein said sensing device further comprising an upper tether and a lower tether, said lower tether  
20 and said upper tether are each secured to forward portions of said inflatable member at one end and a portion of the air bag module at the other, wherein said upper tether and said lower tether are each longer than said tether, wherein either said upper or said lower tether will prevent said tether from providing said force to said sensing element when said inflatable member fully deploys in  
25 a direction other than said first direction.

20. The proximity detection device as in claim 18, wherein said forward end comprises an un-inflated portion of said inflatable member.

30 21. The proximity detection device as in claim 20, wherein said un-inflated portion defines two separate inflation chambers of said inflatable member.

22. A proximity detection device disposed within an inflatable cushion of an air bag module, the proximity detection device comprising:
- a pair of inflatable members;
  - 5 a sensing device operably coupled to each of said pair of inflatable members, each sensing device comprising a tether that is secured to a forward end of one of said pair of inflatable members at one end and a sensing element at the other wherein the distance between said forward end of said pair of inflatable members and said sensing element during unobstructed
  - 10 deployment of said pair of inflatable members in a first direction is longer than said tether and said tether provides a force to said sensing element causing a signal to be generated when said inflatable member deploys in an unobstructed manner in said first direction.
- 15 23. A method for determining whether a portion of an inflatable cushion is obstructed during deployment, the method comprising:
- providing an inflator for inflating said inflatable cushion, said inflator having a first initiator for initiating a first stage of inflation and a second initiator for use with said first initiator for initiating a second stage of inflation,
  - 20 said first stage of inflation providing a first inflation output to said inflatable cushion;
  - deploying a deployable member in a first direction during said first stage of inflation, said deployable member being disposed within said inflatable cushion, said deployable member being in fluid communication with
  - 25 said inflator; and
  - providing an activation signal to said second initiator to initiate said second stage of inflation, wherein said activation signal is only provided if said deployable member deploys unobstructed in said first direction.
- 30 24. The method as in claim 23, wherein said activation signal is generated by a sensing and diagnostic module in response to a signal generated

by a sensing element that generates a signal if said deployable member deploys unobstructed in said first direction, wherein said sensing element is operably coupled to a forward portion of said deployable member.

- 5     25.            A proximity detection device disposed within an inflatable cushion of an air bag module, the proximity detection device comprising:  
                         an inflatable member;  
                         a sensing device operably coupled to said inflatable member,  
                         said sensing device comprising a tether that is secured to a forward end of said  
10    inflatable member at one end and a sensing element at the other wherein the distance between said forward end of said inflatable member and said sensing element during unobstructed deployment of said inflatable member in a first direction is longer than said tether and said tether provides a force to said sensing element causing a signal to be generated when said inflatable member  
15    deploys in an unobstructed manner in said first direction, wherein said inflatable member has an arcuate shape when inflated and said forward end is proximate to an end of said arcuate shape.

26.            The proximity detection device as in claim 25, wherein said  
20    inflatable member comprises a single inflation opening disposed at an end of said arcuate shape opposite said forward end.